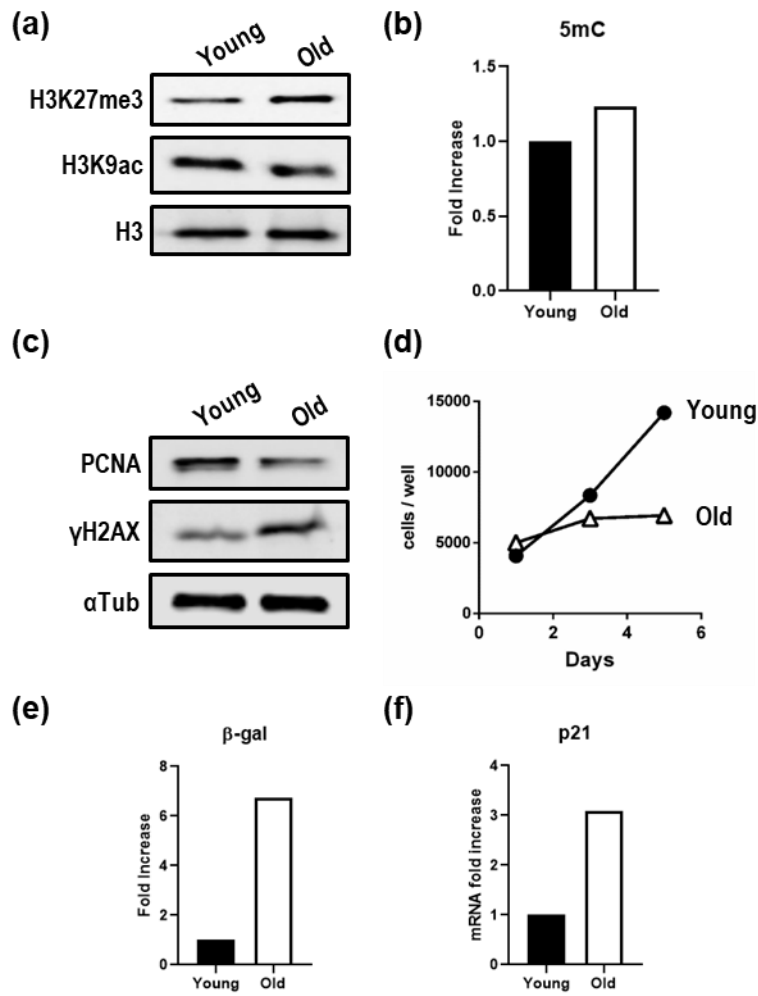
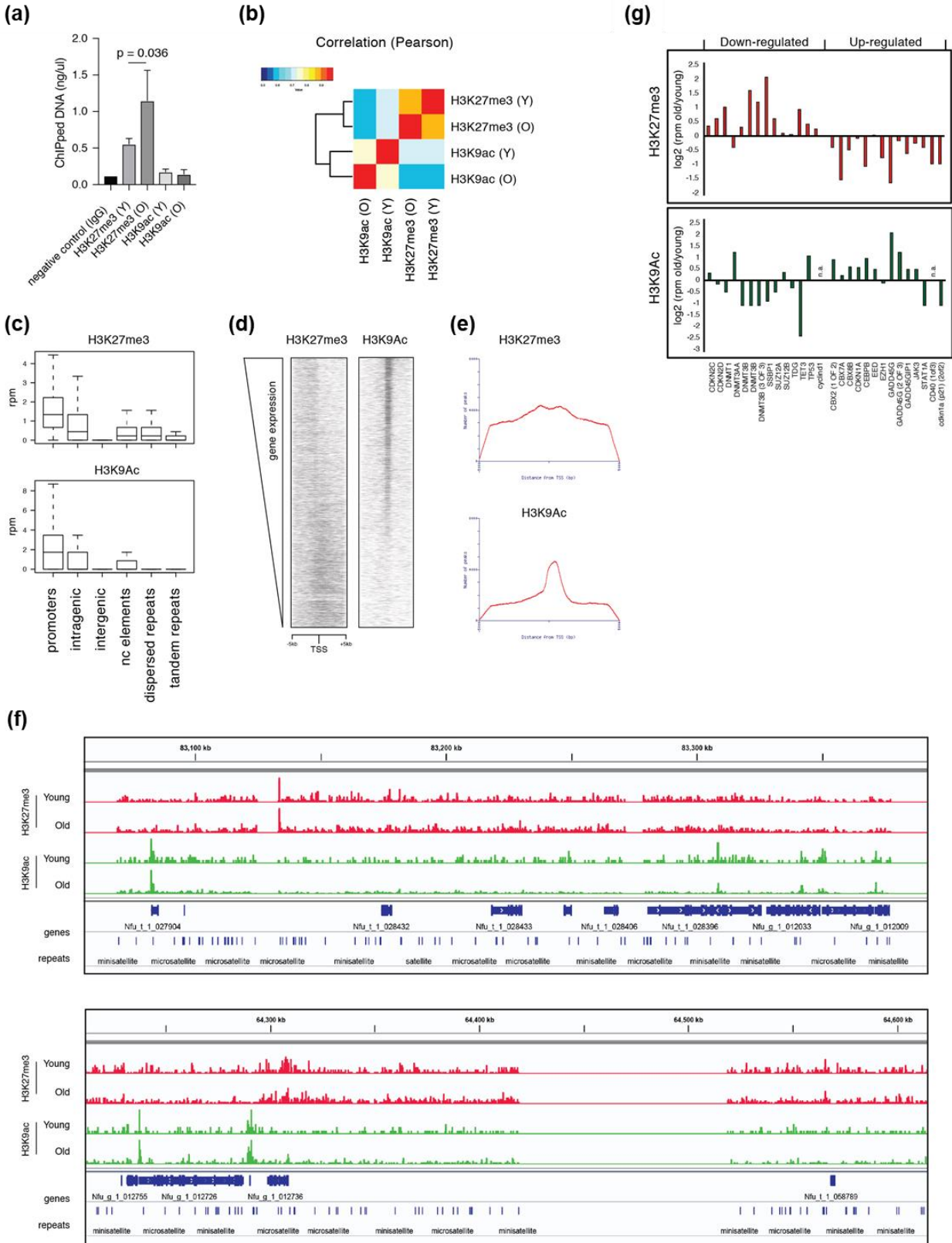


1 Supplementary figures and table
2



3
4 **Figure S1. Cells derived from *Nfu* skeletal muscle tissues resemble tissue of origin.** (a) Western blot for H3K27me3
5 and H3K9ac in cells isolated from young and old *Nfu* skeletal muscle tissue. Tissues from multiple animals were pooled
6 for cell isolation. Total histone 3 was used as loading control. (b) Global DNA methylation quantification of 5mC in
7 cells isolated from young (black bar) and old (white bar) muscle tissue expressed as fold-change versus young. (c)
8 Western blot for proliferating antigen (PCNA) and γ histone 2AX (γ H2AX). α -Tubulin (α Tub) was used as loading
9 control. (d) Growth curve related to cells derived from young (black circles) and old (white triangles) *Nfu* skeletal
10 muscle tissue. (e) Analysis of β -galactosidase (β -Gal) staining in young and old *Nfu* skeletal muscle tissue, number of
11 positive cells expressed as fold increase versus young sample. (f) qRT-PCR analysis of p21 in cells derived from young
12 and old cells derived from *Nfu* muscle tissue.

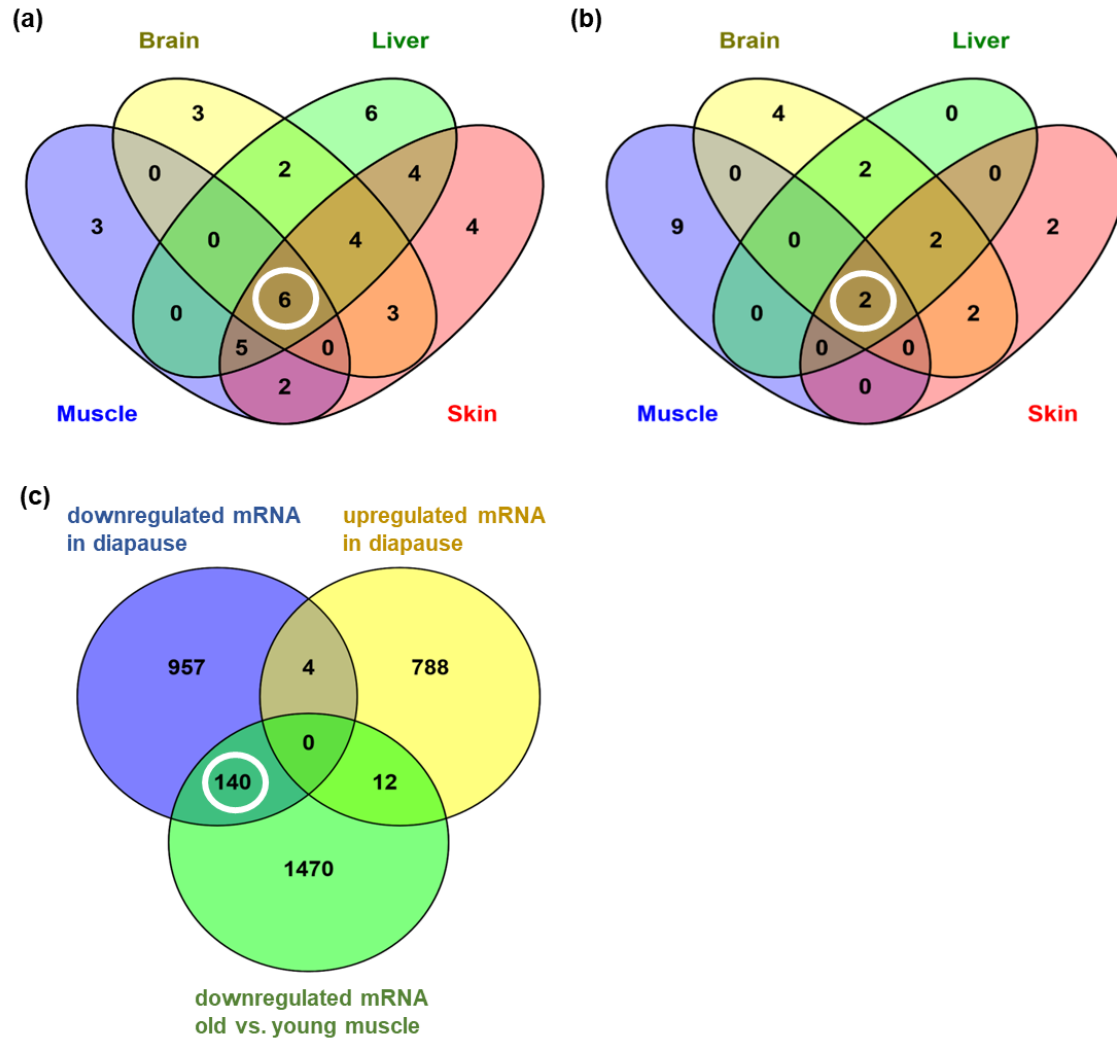
13



14
 15 **Figure S2. Histone marks H3K27me3 and H3K9ac cluster at the transcription start sites.** (a) Amount of immune-
 16 precipitated DNA (ng/ μ l) using anti-H3K27me3 and anti-H3K9ac antibodies. P-value is calculated using t-test. (b)
 17 Person correlation of mapped reads revealed separation of H3K27me3 and H3K9ac samples. (c) Distribution of

18 H3K27me3 (upper plot) and H3K9ac (bottom plot) signals in different genomic features. RPM = Read Per Million. (d)
19 Heatmap of H3K27me3 and H3K9ac signal distribution around transcription start sites (TSS). The genes are sorted from
20 high to low expression. (e) Distribution of H3K27me3 and H3K9ac peaks (p-value cutoff = 0.001) around the TSS. (f)
21 Large genomic views of the mapped reads in the indicated conditions. (g) Log2 of the old/young ratio of H3K27me3
22 (upper panel) and H3K9ac (bottom panel) signal intensity (RPM) for some differentially expressed genes in RNA level
23 during aging.

24



25
 26 **Figure S3. Common mRNA expression profiles in different types of *Nfu* tissues during aging and during diapause**
 27 **indicate global trends.** (a) Venn diagram depicting KEGG pathways commonly down-regulated in *Nfu* skeletal muscle
 28 (blue), brain (yellow), liver (green) and skin (red) tissue comparing young versus old samples. Six KEGG pathways
 29 shared by all four tissues were found (white circle): Ribosome biogenesis in eukaryotes, DNA replication, cell cycle,
 30 aminoacyl-tRNA biosynthesis, pyrimidine metabolism and RNA transport. (b) Venn diagram depicting up-regulated
 31 KEGG pathways in *Nfu* muscle (blue), brain (yellow), liver (green) and skin (red) tissue comparing young versus old
 32 samples. Two common KEGG pathways are found (white circle): Jak/Stat signaling and cytokine/cytokine receptor
 33 interaction. (c) Common mRNA expression profile of down-regulated mRNAs during diapause (blue circle), up-
 34 regulated mRNA during diapause (yellow circle) and down-regulated mRNA in old *Nfu* skeletal muscle tissue (green
 35 circle): mRNAs of 140 genes are down-regulated during diapause and during aging (white circle). Data from Baumgart
 36 *et al.* (2014) (a and b) and Reichwald *et al.* (2015) (c) was used to compare with sequencing results from skeletal muscle.

37

38 **Table S1.** Top 50 regulated transcripts ($\pm 1 \log_2$ FC; base-mean ≥ 5 , FDR ≤ 0.05) in each group depicted in Fig.
 39 4A.

Ensembl gene id	Ensembl chromosome	Ensembl start	Ensembl stop	Ensembl strand	Ensembl gene
824641	GapFilledScaffold_327	63.128	68.488	-	KLF9
649160	GapFilledScaffold_2177	22269	31055	+	UCP2
17780	GapFilledScaffold_369	123399	137173	-	CSRNP1B
605031	GapFilledScaffold_1971	82042	100822	+	ZGC:56306
826927	GapFilledScaffold_626	50793	73608	-	ZBTB16B(1of2)
581036	GapFilledScaffold_4409	19853	46452	+	RASGEF1B(1of2)
673243	GapFilledScaffold_123	254595	263808	+	SIK1
871495	GapFilledScaffold_5595	16075	32476	-	SOGA3B
128543	GapFilledScaffold_288	26344	27228	+	CEBPD
966928	GapFilledScaffold_8767	21001	24664	+	MYH1(2of3)
990605	GapFilledScaffold_3440	67537	68302	+	NFURLNR03440010010
939321	GapFilledScaffold_1269	106127	112760	-	ARRDC2
531846	GapFilledScaffold_146	160532	199879	+	CNKSR1
867431	GapFilledScaffold_610	39908	57370	+	PDE1B
957706	GapFilledScaffold_669	230595	237360	+	ARRDC3A
674222	GapFilledScaffold_1753	24533	29586	+	ZGC:65851
843934	GapFilledScaffold_3880	34710	37862	-	DDIT4L(2of2)
859490	GapFilledScaffold_1547	33392	39398	-	IP6K2(1of2)
704710	GapFilledScaffold_1508	67435	76224	-	TIMM44(1of2)
355284	GapFilledScaffold_296	126991	162445	+	FNIP1
519425	GapFilledScaffold_2446	29759	37279	-	ATAD3B
962503	GapFilledScaffold_73	138398	144432	+	CSRNP1A
685688	GapFilledScaffold_6214	2811	8503	-	SNAP25(3of3)
484773	GapFilledScaffold_786	76990	115787	+	TSC22D3(1of3)
258357	GapFilledScaffold_983	56714	58723	+	EVA1C
158041	GapFilledScaffold_1636	81645	93317	-	PPRC1(2of2)
962068	GapFilledScaffold_292	60344	60880	+	IER2(2of2)
483825	GapFilledScaffold_769	97927	162287	+	SESN1
713692	GapFilledScaffold_2026	60503	83700	+	WHSC1
476666	GapFilledScaffold_132	104148	130966	+	NUAK1(1of2)
784281	GapFilledScaffold_4434	10385	33583	+	IGF2BP3
622626	GapFilledScaffold_5836	1985	50332	+	ANLN(2of2)
11155	GapFilledScaffold_2278	2194	10052	-	PPM1G
614992	GapFilledScaffold_9391	19963	21362	-	COX4I1(1of2)
977955	GapFilledScaffold_25	328261	331963	-	BHLHE40(2of2)
407941	GapFilledScaffold_1115	30876	40232	-	SMARCA5
432733	GapFilledScaffold_1121	171487	209599	-	RSBN1L(1of2)
891380	GapFilledScaffold_483	254685	351282	+	PACS1(1of3)
507527	GapFilledScaffold_1568	126217	134624	-	TNNT2D

17042	GapFilledScaffold_1355	314328	315203	+	CEBPB
410982	GapFilledScaffold_4905	16083	48451	-	MAP1B(2of3)
261326	GapFilledScaffold_7258	367	33544	-	SLC1A4
374730	GapFilledScaffold_1608	183172	186260	-	KBTBD12
540930	GapFilledScaffold_710	96875	100744	+	SERPINH1
151295	GapFilledScaffold_66	230082	279694	+	MICAL2A
620868	GapFilledScaffold_8948	571	12099	+	SLC16A12(2of2)
623059	GapFilledScaffold_216	157217	160467	+	DDX10
88156	GapFilledScaffold_700	128485	196324	-	CLTCB
759680	GapFilledScaffold_2366	23840	41512	+	CLUHA
202270	GapFilledScaffold_11308	10098	13438	-	MYH6(3of3)
221083	GapFilledScaffold_175	121.761	145.743	-	COL2A1A
14897	GapFilledScaffold_662	19878	42372	-	ERCC5
199420	GapFilledScaffold_50	45001	49384	-	NEFMA(1of2)
603816	GapFilledScaffold_239	69596	116405	-	TACC2
78610	GapFilledScaffold_7876	23922	27838	-	HIST2H2BE(1of9)
755476	GapFilledScaffold_607	139260	157105	+	TUT1
619878	GapFilledScaffold_5804	23048	26019	-	NFIL3(2of3)
591963	GapFilledScaffold_8988	973	22168	+	ASPM(3of3)
540692	GapFilledScaffold_3270	69697	74398	+	TBX22
529223	GapFilledScaffold_10342	241	11526	+	SMCR8B
57170	GapFilledScaffold_603	208114	213028	-	ARX
728569	GapFilledScaffold_1832	119461	169869	+	PDLIM5(2of2)
85341	GapFilledScaffold_1770	152338	201300	-	PRX(14of16)
787172	GapFilledScaffold_508	199111	201571	+	NFURG00508170300
896111	GapFilledScaffold_275	51790	63723	+	SPOCK3(1of2)
837949	GapFilledScaffold_3238	46505	52882	+	AKT1S1
170137	GapFilledScaffold_5518	52596	75496	-	UACA
20380	GapFilledScaffold_286	101208	104664	+	NEFH(2of5)
204713	GapFilledScaffold_5114	14242	30001	-	PRDM16(1of2)
605240	GapFilledScaffold_3572	63024	101479	-	ZNF704(2of3)
785268	GapFilledScaffold_14622	1641	5232	+	HEL_DR4(1of4)
383358	GapFilledScaffold_3564	88732	90930	-	STMN1(2of3)
554129	GapFilledScaffold_549	43104	54733	-	STMN2B
907981	GapFilledScaffold_283	514	12636	-	PGAP3
940728	GapFilledScaffold_57	99238	138038	+	PDE4DIP(1of3)
148972	GapFilledScaffold_254	372519	375577	+	MARCKSB
541938	GapFilledScaffold_4754	2640	57452	+	CDKL5(1of3)
RF00478	GapFilledScaffold_3672	25535	25803	-	SCARNA6
511648	GapFilledScaffold_3084	2451	20062	+	DSCAML1(4of4)
829769	GapFilledScaffold_3908	38203	42815	-	ASB15(2of2)
992166	GapFilledScaffold_4413	60313	61325	-	NFURLNR04413020010
537826	GapFilledScaffold_1951	79724	112717	+	KIF11

821510	GapFilledScaffold_2236	889	3357	-	HIST2H3D(3of7)
864210	GapFilledScaffold_3928	5303	20255	+	MYLIPA
564175	GapFilledScaffold_2794	18503	35432	+	BX957278.1(1of2)
363169	GapFilledScaffold_53	125.988	155.217	+	SI:DKEY-11F4.16(2of3)
991287	GapFilledScaffold_3820	32840	33602	+	NFURLNR03820030010
919000	GapFilledScaffold_51	100130	120451	+	NADL1.2(3of5)
481517	GapFilledScaffold_2326	84618	92286	+	TJAP1(3of3)
58493	GapFilledScaffold_8	285287	286965	-	CHAC1(1of2)
316473	GapFilledScaffold_2195	45195	47771	-	CDKN1A(2of2)
751867	GapFilledScaffold_2748	24178	38428	-	SI:DKEYP-67G8.1(1of2)
982832	GapFilledScaffold_2195	49180	49393	-	NFURLNR02195030100
305262	GapFilledScaffold_10553	5468	19187	-	KANSL3(1of7)
18846	GapFilledScaffold_10703	10568	15191	+	RYR3(4of9)
662548	GapFilledScaffold_2341	53173	63032	-	SI:CH211-119O8.4
441154	GapFilledScaffold_12511	2	9819	-	KANSL3(5of7)
596594	GapFilledScaffold_599	47298	49893	-	KLF11B
153949	GapFilledScaffold_2546	3968	18002	-	SI:CH73-209E20.3
220820	GapFilledScaffold_175	150807	164720	+	GLS2(2of2)
84852	GapFilledScaffold_1550	56556	63420	+	SI:CH211-212K5.3(4of8)
497982	GapFilledScaffold_4914	10487	16841	+	ZFAND5A
993139	GapFilledScaffold_51	81133	81439	+	NFURLNR00051020010
587497	GapFilledScaffold_14653	1836	5775	-	NFURG14653010002
764839	GapFilledScaffold_106	131576	143958	+	MKNK2B
81394	GapFilledScaffold_11811	6201	10887	-	POLR3GL
147114	GapFilledScaffold_6676	13656	16427	+	RTL1(5of18)
636187	GapFilledScaffold_9404	8566	20566	+	CADM4(1of3)
307238	GapFilledScaffold_5847	47948	75485	-	TSC22D3(3of3)
338123	GapFilledScaffold_1484	31465	43511	+	MNT(1of2)
117280	GapFilledScaffold_399	172004	185900	-	MNT(2of2)
615046	GapFilledScaffold_11090	1105	1416	-	HIST1H4I(1of10)
544560	GapFilledScaffold_1712	217259	228495	-	NR1D2(4of4)
661977	GapFilledScaffold_11895	4967	9139	-	NFURG11895010002
265564	GapFilledScaffold_713	145272	176766	-	NR4A3
513443	GapFilledScaffold_1396	169	2800	-	AP001468.1(14of32)
779044	GapFilledScaffold_4454	124114	124962	+	SI:CH73-269M14.4(7of7)
351918	GapFilledScaffold_28	341424	347751	-	GPR157
483323	GapFilledScaffold_3743	4748	7446	-	PLAUR(2of2)
908266	GapFilledScaffold_283	130842	138394	-	PELO
973345	GapFilledScaffold_574	307091	312611	+	BCL2L1
631579	GapFilledScaffold_3493	47800	53477	-	FAM107B